National Institute of Environmental Health Sciences

Climate variability and hemorrhagic fever with renal syndrome transmission in Northeastern China

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Abstract:

BACKGROUND: The transmission of hemorrhagic fever with renal syndrome (HFRS) is influenced by climatic variables. However, few studies have examined the quantitative relationship between climate variation and HFRS transmission. OBJECTIVE: We examined the potential impact of climate variability on HFRS transmission and developed climate-based forecasting models for HFRS in northeastern China. METHODS: We obtained data on monthly counts of reported HFRS cases in Elunchun and Molidawahaner counties for 1997-2007 from the Inner Mongolia Center for Disease Control and Prevention and climate data from the Chinese Bureau of Meteorology. Cross-correlations assessed crude associations between climate variables, including rainfall, land surface temperature (LST), relative humidity (RH), and the multivariate El Nino Southern Oscillation (ENSO) index (MEI) and monthly HFRS cases over a range of lags. We used time-series Poisson regression models to examine the independent contribution of climatic variables to HFRS transmission. RESULTS: Cross-correlation analyses showed that rainfall, LST, RH, and MEI were significantly associated with monthly HFRS cases with lags of 3-5 months in both study areas. The results of Poisson regression indicated that after controlling for the autocorrelation, seasonality, and long-term trend, rainfall, LST, RH, and MEI with lags of 3-5 months were associated with HFRS in both study areas. The final model had good accuracy in forecasting the occurrence of HFRS. CONCLUSIONS: Climate variability plays a significant role in HFRS transmission in northeastern China. The model developed in this study has implications for HFRS control and prevention.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920909

Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

El Nino Southern Oscillation, Extreme Weather Event, Meteorological Factors, Precipitation, Temperature

Geographic Feature: ☑

resource focuses on specific type of geography

Mountain

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: China

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease, Urologic Effect

Infectious Disease: Zoonotic Disease

Zoonotic Disease: Hantavirus Pulmonary Syndrome

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Racial/Ethnic Subgroup

Other Racial/Ethnic Subgroup: non-Han Chinese

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content